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10/612,080

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Dong-Hwan Kim

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02/18/2005

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EXAMINER

TSAL, CAROL S W

ART UNIT

PAPER NUMBER

2857

DATE MAILED: 02/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/612,080

Applicant(s)

KIM ET AL.

Examiner

Carol S. Tsai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 4, and 7-10 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent No. 6,208,147 to Yoon et al. (referred thereafter as Yoon et al.'147)

With respect to claims 1 and 4, Yoon et al.'147 disclose a method for evaluating a capacity of at least one secondary battery, the method comprising: (a) preparing the at least one secondary battery to at least one of partially charged to a voltage less than a full charge voltage and partially discharged to a voltage less than the full charge voltage (see col. 6, lines 49-52); and (b) measuring an impedance spectrum for the prepared battery (see col. 6, lines 53-56); (c) mathematically operating specific internal resistance components obtained from an equivalent circuit model fitted from the impedance spectrum measured (see Figs. 4 and 9; col. 6, lines 61-65; and col. 7, lines 35-45); and (d) comparing the mathematical operation value of the resistance components with an initial discharge capacity graph to evaluate an initial discharge

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capacity of a unknown battery of the same group (see Fig. 7; Abstract, lines 1-13; col. 2, lines 35-58; and col. 6, line 61 to col. 7, line 56).

As to claim 2, Yoon et al.'147 also disclose the equivalent circuit model used for simulation of the impedance spectrum including model parameters of nonlinear resistors, nonlinear capacitors and nonlinear transfer lines (see col. 5, lines 10-12).

As to claim 7, Yoon et al.'147 also disclose the batteries being discharged to a voltage level less than a full charge voltage to provide less than 10% of the discharge capacity (see col. 6, lines 57-60).

As to claim 8, Yoon et al.'147 also disclose the equivalent circuit model used for simulation of the impedance spectrum including model parameters of nonlinear resistors, nonlinear capacitors and nonlinear transfer lines (see col. 5, lines 10-12).

As to claim 9, Yoon et al.'147 also disclose the impedance spectrum being measured in a frequency range of 10 mHz to 10 kHz (see col. 6, lines 53-56).

As to claim 10, Yoon et al.'147 also disclose the equivalent circuit model used for simulation of the impedance spectrum including model parameters of nonlinear resistors, nonlinear capacitors and nonlinear transfer lines (see col. 5, lines 10-12).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 3, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoon et al.'147 in view of U. S. Publication 2003/0082458 to Oyama.

As noted above, with respect to claims 3 and 5, Yoon et al.'147 disclose the claimed invention, except for the discharge capacity graph being a capacity correlation graph obtained from a relationship equation with the initial discharge capacity determined after a discharge performed with a discharge rate of 1.0 C.

Oyama teaches the discharge capacity graph being a capacity correlation graph obtained from a relationship equation with the initial discharge capacity determined after a discharge performed with a discharge rate of 1.0 C (see paragraph 0127).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Yoon et al.'147's method to include the discharge capacity graph being a capacity correlation graph obtained from a relationship equation with the initial discharge capacity determined after a discharge performed with a discharge rate of 1.0 C, as taught by Oyama, in order that the charging capacity can be set at 80% of that estimated from the amount of the redox active materials.

As to claim 6, Yoon et al.'147 also disclose the equivalent circuit model used for simulation of the impedance spectrum includes model parameters of nonlinear resistors, nonlinear capacitors and nonlinear transfer lines (see col. 5, lines 10-12).

6. Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoon et al.'147 in view of U. S. Patent No. 6,160,382 to Yoon et al. (referred thereafter as Yoon et al.'382).

As noted above, Yoon et al.'147 disclose the claimed invention, except for resistance components and charge transfer resistance components related to a degradation of an electrolyte, a separator or a current collector.

Yoon et al.'382 teach resistance components and charge transfer resistance components related to a degradation of an electrolyte, a separator or a current collector (see Fig. 1 and col. 4, lines 17-23).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Yoon et al.'147's method to include resistance components and charge transfer resistance components related to a degradation of an electrolyte, a separator or a current collector, as taught by Yoon et al.'382, in order to determine characteristic parameters of a charge storage device.

7. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoon et al.'147 in view of Yoon et al.'382 as applied to claims 1 and 9-11 above, and further in view of U. S. Publication 2003/0082458 to Oyama.

As noted above, Yoon et al.'147 in combination with Yoon et al.'382 teach all the features of the claimed invention, but do not disclose the discharge capacity graph being a capacity correlation graph obtained from a relationship equation with the initial discharge capacity determined after a discharge performed with a discharge rate of 1.0 C.

Oyama teaches the discharge capacity graph being a capacity correlation graph obtained from a relationship equation with the initial discharge capacity determined after a discharge performed with a discharge rate of 1.0 C (see paragraph 0127).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Yoon et al.' 147 in combination with Yoon et al.' 382's method to include the discharge capacity graph being a capacity correlation graph obtained from a relationship equation with the initial discharge capacity determined after a discharge performed with a discharge rate of 1.0 C, as taught by Oyama, in order that the charging capacity can be set at 80% of that estimated from the amount of the redox active materials.

As to claim 13, Yoon et al.' 147 also disclose the secondary battery including a lithium ion battery, a lithium polymer battery, a Ni--Cd battery and a NiMH battery (see col. 5, lines 10-12).

Response to Arguments

8. Applicant's arguments filed January 28, 2005 have been fully considered but they are not persuasive.

Applicants argue that "The present invention is directed to evaluating a discharge capacity of an unknown battery of a same group, which it is respectfully submitted, is not taught in any of the cited references. Among other things, Claim 1 recites comparing the mathematical operation value of the resistance components with an initial discharge capacity graph to evaluate an initial discharge capacity of an unknown battery of the same group. It is respectfully submitted that this feature of the present invention is shown in the graphs illustrated in FIGs. 8-12 of the present application. In the rejection, however, the Examiner asserts that FIG. 7 of Yoon teaches this feature. As indicated above, it is respectfully submitted that the Examiner is incorrect. More specifically, FIG. 7 of Yoon is a graph comparing a charge transfer resistance

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and a remaining capacity, not a graph comparing mathematical operation values of the resistance components ($R_{ser} \times R_{ct}$) with an initial discharge capacity graph (Initial Discharge Capacity) as shown in Figs. 8-12 and recited in independent Claim 1 of the present application". The

Examiner disagrees with Applicants. Fig. 7 is one of several sections cited by the Examiner only for indicating that Yoon does teach a graph of comparing the mathematical operation. However, Applicants remain silent about most of other cited sections, such as Figs. 4, Abstract, lines 1-13, col. 2, lines 35-58, col. 6, lines 49-55, and col. 6, line 61 to col. 7, line 56, of U. S. Patent No. 6,208,147 to Yoon et al. that also cited by the Examiner for rejecting applicants' claimed invention. As set forth in the art rejection above, Yoon does clearly disclose a method for evaluating a capacity of at least one secondary battery, the method comprising: (a) preparing the at least one secondary battery to at least one of partially charged to a voltage less than a full charge voltage and partially discharged to a voltage less than the full charge voltage (see col. 6, lines 49-52); and (b) measuring an impedance spectrum for the prepared battery (see col. 6, lines 53-56); (c) mathematically operating specific internal resistance components obtained from an equivalent circuit model fitted from the impedance spectrum measured (see Figs. 4 and 9; col. 6, lines 61-65; and col. 7, lines 35-45); and (d) comparing the mathematical operation value of the resistance components with an initial discharge capacity graph to evaluate an initial discharge capacity of a unknown battery of the same group (see Fig. 7; Abstract, lines 1-13; col. 2, lines 35-58; and col. 6, line 61 to col. 7, line 56).

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol S. W. Tsai whose telephone number is (571) 272-2224. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571) 272-2216. The fax number for TC 2800 is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2800 receptionist whose telephone number is (571) 272-1585 or (571) 272-2800.

In order to reduce pendency and avoid potential delays, Group 2800 is encouraging

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FAXing of responses to Office actions directly into the Group at (703) 872-9306. This practice may be used for filing papers not requiring a fee. It may also be used for filing papers which require a fee by applicants who authorize charges to a PTO deposit account. Please identify the examiner and art unit at the top of your cover sheet. Papers submitted via FAX into Group 2800 will be promptly forwarded to the examiner.

A handwritten signature in cursive script, appearing to read 'Carol S. W. Tsai'.

Carol S. W. Tsai
Patent Examiner
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02/13/05